

## REMARKS

The entire premise of the subject invention is that maintenance requirements in rotating equipment can be predicted based on the condition of the equipment as opposed to a periodic, time based maintenance schedule. The method is applied to rotating equipment which normally operates in both loaded and unloaded conditions and requires the application of a vibration sensor to the equipment both in the loaded and unloaded conditions so that the output of the sensor may be compared.

With respect, it appears that the Examiner has not understood what is meant by operating in "loaded and unloaded" conditions. In the specific examples given in the patent application, the rotating equipment consists of a drive spindle for a work roll used in a rolling mill, in particular, for steel making operations to roll slabs of metal until they achieve the desired gauge and length (as described at Page 3 of the application third paragraph with reference to Fig. 1 of the accompanying drawings).

Further at Page 4, paragraph 3 the following description will clarify the meaning of the terminology "loaded" and "unloaded". For the purposes of comparing vibration during loaded and unloaded conditions, automatic triggers are used to determine the start of the loaded condition and the unloaded condition. The time associated with the loaded condition is the ten second sampling time interval at the end of a coil just prior to the piece exiting the mill. The time associated with the unloaded condition is the ten seconds sampling time interval after the work piece has left the mill and the mill is running at a constant idle speed. In other words, a loaded condition takes place while a work piece is in the mill and is being rolled to achieve a desired gauge, shape or length. The unloaded condition takes place when the work piece has left the mill and the work rolls are idling.

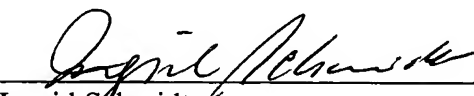
The cited prior art of Husseiny does not relate to the prediction of maintenance requirements in rotating equipment that normally operates in loaded and unloaded conditions. The Examiner has referred the reader to column 1, lines 9 to 25 which generally describe rotating mechanical equipment of the kind found in gear boxes for helicopters and coolant pumps in nuclear power stations. Husseiny proposes to intentionally initiate defects to determine threshold indices of drift and diffusion co-

efficiency as described at Column 24. Further it is mentioned that the model capability can be extended to consider the applied load (torque) and operating conditions (variability of load) but there is clearly no calculation to compare the magnitude of an unloaded signal to the magnitude of a loaded signal.

The Examiner further relies Choe et al for teaching that the sensor may be selected from the group comprising a velometer, an accelerometer and a "piezoelectric crystal, the electric signal generated being either current or voltage. While Choe et al does indeed teach the use of a vibration sensor such as a piezoelectric accelerometer, Choe is also a demonstration of a very complex, computerized system that is very costly and which therefore teaches away from the simple effective solution provided by applicant's invention. Choe is directed to the setting of threshold levels that correspond to the environment surrounding the device in order to reduce the incidence of false alarms. There is no suggestion or teaching that a simple analysis of raw data to compare the signal from a loaded piece of equipment to the signal received from an unloaded piece of equipment can be used to predict operating conditions and the likelihood of failure.

Favorable reconsideration of this application and its allowance are respectfully requested.

Respectfully submitted,

  
\_\_\_\_\_  
Ingrid Schmidt  
Registration No. 33344  
IES:nf

Customer No. 28079  
Gowling Lafleur Henderson LLP  
One Main Street West, Hamilton, Ontario  
Canada L8P 4Z5  
Direct: (905) 540-3277

HAM\_LAW\156123\1